

Remarks/Arguments

Reconsideration of the rejection of claims 1, 3-5, 9-11 and 16 under 35 USC 102 based on Richter is respectfully requested for the following reasons. Richter discloses a nozzle for modulating flow of molten metal from a tundish in a continuous casting system. Applicant's invention, on the other hand, is a precision dispensing tip for dispensing small amounts of fluid, for example viscous materials such as adhesive on printed circuit boards, where it is important to provide consistent shapes of the material applied to a series of locations on a surface and to do so at a relatively fast rate of travel from location to location. Richter does not disclose a precision dispensing tip in the manner provided by applicant's invention, and independent claims 1 and 9 are amended to emphasize this distinction over Richter.

Richter is concerned with the considerably different problem of destructive cracking in a nozzle which handles a relatively large volume flow of molten metal, such cracking being caused by large thermal gradients giving rise to different rates of thermal expansion in the shells or layers of a nozzle composite body. Applicant's invention, on the other hand, is directed to the problem of avoiding discontinuities in the fluid flow and avoiding introduction of turbulence to the fluid flow in a tip for dispensing small amounts of fluid in consistent sizes and shapes to a series of locations along a surface.

An aspect of applicant's invention contributing to the solution of the foregoing problem is the fact that the axial length of the first or converging portion of the fluid

conducting passage is several times greater than the second portion which extends from the converging portion to the outlet. In the nozzle of Richter, on the other hand, the axial length of the converging section B is substantially equal to the axial length of the section between B and outlet 37.

To emphasize the foregoing significant distinction over Richter, claim 1 has been amended to call for the axial length of the first portion being at least three times the axial length of the second portion. Likewise, claim 9 has been amended to call for the length of the first or converging portion being at least three times the length of the second portion which extends from the first portion to the outlet.

In addition, it is submitted that one skilled in the art, seeking to solve the problem to which applicant's invention is directed, would not look to the significantly different art represented by Richter which deals with avoiding destructive cracking in a nozzle handling relatively large volumes of flow of molten metal.

In view of the foregoing, claims 1, 3-5, 9-11 and 16 as amended are believed to patentably distinguish over Richter within the meaning of 35 USC 102 and 35 USC 103.

Reconsideration of the rejection of claim 1 under 35 USC 103 based on Tomasello is respectfully requested for the following reasons. Tomasello is directed to a nozzle for use in fluid stripping apparatus, such as that found in automatic vehicle car washes for stripping rinse water from the vehicle surface, employing air at high velocity and high pressure.

Thus, Tomasello does not disclose a precision dispensing tip as claimed by applicant..

Tomasello is directed to the considerably different problem of providing "a fluid stripping apparatus which projects air from a nozzle much further than conventional apparatus without appreciable loss of velocity to deliver a high-volume, high-pressure flow of air at low horsepower and which can strip fluids from a surface at a distance."

Claim 1 is amended to call for the first or converging portion of the fluid conducting passage being in the shape substantially of a frustum of a right circular cone. The portion 16a, 16b of the Tomasello nozzle does not have this shape. Claim 1 is further amended to call for the inlet having a diameter at least four times the diameter of the outlet. In the Tomasello nozzle, the diameter of inlet 14 is about three times the diameter of outlet 20 (col. 4, lines 6 and 7). These aspects of applicant's invention called for in amended claim contribute to the solution of the problem of avoiding discontinuities in the fluid flow and avoiding introduction of turbulence to the fluid flow in a tip for dispensing small amounts of fluid in consistent sizes and shapes to a series of locations along a surface.

In addition to the foregoing, it is submitted that one skilled in the art, seeking to solve the problem to which applicant's invention is directed, would not look to the significantly different art represented by Tomasello which deals with a nozzle for handling a large volume of air.

In view of the foregoing, amended claim 1 is believed to patentably distinguish over Tomasello within the meaning of 35 USC 103.

Reconsideration of the rejection of claims 1, 6 and 7 under 35 USC 103 based on Heron et al. in view of Vickers is respectfully requested for the following reasons. In the nozzle assembly of Heron, the axial length of the converging portion 5 is many times shorter than the axial length of the portion 3 which extends from portion 5 to outlet 6. This is the exact opposite of the structure feature of applicant's precision dispensing tip called for in amended claim 1.

Vickers, which discloses a cavitation nozzle for a high velocity jet of fluid having both diverging 22 and converging 24 sections separated by a constant diameter section 26, is not believed to disclose anything having a bearing on the reasons why amended claim is believed to patentably distinguish over Heron.

Accordingly, claim 1 as amended and dependent claims 6 and 7 are believed to patentably distinguish over Heron et al. and Vickers within the meaning of 35 USC 103.

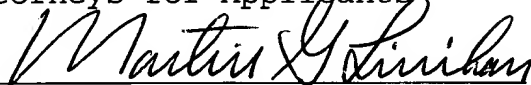
The rejection of claims 2 and 12 under 35 USC 103 based on Richter is respectfully traversed. Dependent claims 2 and 12 include all the limitations of amended claims 1 and 9, respectively, which for the reasons set forth above are believed to patentably distinguish over Richter within the meaning of 35 USC 103.

The rejection of claims 14 and 15 under 35 USC 103 based on Richter in view of Vickers is respectfully traversed. Dependent

claims 14 and 15 include all the limitations of amended claim 9 which, for the reasons set forth above, is believed to patentably distinguish over Richter within the meaning of 35 USC 103.

Favorable action on this application is respectfully requested.

Respectfully submitted,  
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